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Celsius, but the climate is rather dry and there are no glaciers. Dr. Woeikoff shows by examples that the difference of mean temperatures at the lower ends of glaciers reaches as much as fully 20°. Provided the quantity of rain and snow is great, glaciers descend as low as 212 meters above the sea-level, as in New Zealand, which has the latitude of Nice and the mean temperature of Vienna and Brussels. He also discusses the decided influence great masses of snow exert upon the temperature of a country.——Dr. Kirk, the English Consul-general at Zanzibar is preparing a work on the tsetse fly.——The Portuguese propose to establish four great stations in Central Africa from which the exploration of the surrounding districts can be carried on.——The missionaries at the University's Mission Station at Masasi, state that the River Lujenda is believed to rise from a great lake east of Nyassa, and it is probable that a good sized lake still remains to be discovered to the north or north-east of Shirwa.——The Italian travelers Dr. P. Matteucci and Lieut. Alfonso Massari reached Liverpool on August 5th, from a journey across Africa. They left Suakin, on the Red Sea, on March 5, 1880, and proceeded by way of Khartum and the province of Kordofan to El Fasher, the capital of Darfur. After wearisome negotiations they were allowed to go to Abeshr, the chief town of Wadai. They then visited Lake Chad, and after traversing Bornu, Baghirmi, Sokoto, &c., they arrived at Egga on June 8, 1881, and reached the Gulf of Guinea shortly afterwards. As the countries passed through are all more or less known, no great discoveries were made, though the travelers were the first Europeans to make the entire journey from the Red Sea to the Atlantic. Dr. Matteucci unfortunately succumbed to disease contracted during the journey, and died, after reaching London, on August 7th.——Mr. Thomson, the African traveler, has arrived at Zanzibar, having been employed by the Sultan to examine the mineralogy of the mainland and also to look for coal which is said to be found near the coast.——The new map of the United States, preparing under the direction of the U. S. Geological Survey, is on a scale of 1 : 250,000.——Dr. O. Finsch, the Polynesian traveler, arrived at Sydney from New Britain early in May last. During his visit of eight months in that island he made large collections, including 12,000 geological specimens. He now visits New Zealand, and goes afterwards to North Australia and thence to New Guinea, making careful observations of the character and habits of the natives of these regions.

MICROSCOPY.[1]

EXAMINATION OF CARBON DIOXIDE IN THE FLUID CAVITIES OF MINERALS.—Mr. Alexis A. Julien thus describes the method employed in his investigations:

"The qualitative identification of carbon dioxide in the cavities of a mounted thin section of a mineral, may be determined, at least with probability, after some experience, through various optical appearances and physical characteristics which have been often described. It is usually effected with certainty and ease, through the rapid and enormous expansion and ultimate disappearance, either of the liquid or of the gaseous bubble, on the application of a gentle heat for a few seconds, such as that of a cigar, the heated end of a rod, or jet of hot air, or even a jet of the warm breath conveyed through a flexible rubber tube. When the slide and the thin section are thin, even the heat (37° C.) of the tip of one's finger, applied for a few seconds to the bottom of the slide without removal from the stage of the microscope, may be sufficient to produce the characteristic phenomena, *e. g.*, the contraction and disappearance of a bubble whose size is relatively small to that of the liquid in which it floats.

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[1] This department is edited by Dr. R. H. WARD, Troy, N. Y.

" For the determination of the temperature of disappearance of the bubble, which may vary from 20° to 32° C., several forms of stage heating apparatus may be employed. * * * In place of all these, a simple and inexpensive apparatus may be substituted, consisting of a miniature water bath in which are immersed the entire section and slide, the bulb of the thermometer, and the nose of the objective. It consists of a box of tinned copper (tinned iron is liable to rust), of length sufficient to project a few centimeters on either side of the stage of the microscope employed ; the one I use being twenty-three centimeters in length, 4 centimeters in width, and three centimeters in depth. This is laid across the stage of the microscope, separated from the metal by thin plates of cork, and is heated by a short wax taper (night-light) underneath either extremity. The slide may rest upon the bottom guarded from the metal by little rubber bands beneath the ends, and wedged firmly by a little wooden wedge beneath the horizontal thermometer bulb; or a thermometer with ring-shaped bulb may be inserted, upon which the slide may rest directly, firmly attached by one or two slender rubber bands. The thermometer should be of guaranteed accuracy, with wide degrees, subdivided if possible, with a range which need not much exceed 20 to 32° C. The preparation is then covered by any pure and clear water, preferably filtered (distilled is unnecessary), to a depth of about two centimeters. A circular aperture in the bottom of the box, eighteen millimeters in diameter, is covered with glass attached by cement, and through this the light is thrown up from the mirror. The cavity to be examined is then carefully adjusted and focussed, a taper is lit, and the eye remains at the eye-piece until the critical point is reached. A glass tube with its point terminating just below the edge of the slide, is connected with the mouth during the experiment by a small rubber tube. As the temperature slowly rises, a constant current of small bubbles of the warm breath (whose temperature, 32°, only assists the operation) may be blown up with little fatigue through the tube, to effect a thorough intermixture of unequally heated layers in the water stratum. The determination of the temperature of the disappearance of the bubble is easily obtained within five minutes, and that of its reappearance in about the same time. A low-power objective may be carefully wiped if its anterior lens is dimmed by flying drops or by rising vapor, when a high temperature is being attained; but it is best to insert the whole objective in a small, narrow glass beaker floating upon the surface of the bath over the preparation. * * * In place of the flowing tube a little agitator or churn at the end of the box had been previously tried, to produce the intermixture of the contents of the bath, but was given up on account of the inconvenient vibration and frequent dislodgment of the slide."

A still simpler apparatus was found to be more convenient when high temperatures were not required. In this case a plate of copper or brass 23 centimeters long, 6.5 centimeters wide, and 1 millimeter thick, with a central aperture of 2.5 centimeters, partly wrapped in pasteboard to prevent radiation, was laid upon the stage of the microscope. Over the central aperture was placed a glass tank about six centimeters wide and three centimeters deep, formed of a small chemical beaker with thin bottom and with its upper portion cut off; and in this tank were placed the object, a delicate thermometer and a pointed glass tube, with flexible rubber connection for blowing, held in place by a wire support attached to the metal plate. The section of mineral, mounted on a thin slide, is held in place by rubber bands, or by a small brass weight. Only a single taper is required, and the disappearance of the bubble may be completed in less than five minutes. In summer the temperature of the atmosphere alone may be sufficient, especially if assisted by the current of warm breath, to obliterate the gas bubble. Its return may be readily caused, in a warm atmosphere, by adding, from time to time, a few drops of cool water to the bath, while the eye remains at the eye-piece, and a steady current of air is blown through the glass tube; with this apparatus, which may be called the immersion warm bath, it matters little, for most purposes, what liquid, stand or objective is employed; and there is no difficulty in obtaining, satisfactorily, the two determinations within ten minutes, to an approximation of about one-twentieth of a degree. These forms of apparatus may be of service in other branches of thermal microscopy where an exact determination of the temperature applied is desirable.

DEATH OF CHARLES A. SPENCER.—Those who work with the microscope, or enjoy its teachings, will not soon forget that they have lost a friend in the death of this remarkable man, which occurred at Geneva, N. Y., on the 28th of September. Almost without preliminary education, he undertook the manufacture of microscopes, with little knowledge of the experience of others in the same work, and but little qualification except his individual industry, intelligence and ingenuity. Apprehending the value of aperture as a means of resolution, far in advance of the rest of the world he produced objectives that were not only unequaled, but for a time quite unintelligible. The position so suddenly acquired was worthily occupied; and for nearly half a century Mr. Spencer has maintained a place, by his extraordinary genius for original contrivance and his tact in accomplishing extremely fine work, among the first of the manufacturing opticians in the world. His life was spent at Canastota, N. Y., except the last few years, which were spent at Geneva. From his shop at Canastota he sent out Mr. Tolles, who has since divided the honors with his instructor as a maker of extremely fine and really original microscopical work; and during recent years, as superintendent of the Geneva optical works, while feeble from age and failing health, he has proved so good an organizer and instructor, that his sons have been enabled to produce lenses that would not suffer by comparison with the best work of their father. Among the first and oldest of the original circle of microscopists in this country, and not more skillful as an optician than genial and friendly as a man, he will be greatly missed by his friends, and remembered and honored by all who are interested in his branch of science.

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SCIENTIFIC NEWS.

— The results obtained in the recent deep sea explorations by the Coast Survey steamer *Blake* are of special interest as affording new data for mapping down the floor of the Atlantic. Since May last the *Blake*, under command of Commander Bartlett, reports having run lines of soundings across the Gulf stream from the Florida straits to Cape Hatteras, at the same time making an examination of the great ocean current. The new data obtained show that the Bahama Banks extend in an almost level submarine plateau nearly two hundred miles in width off the Carolinas, and drawing to a point off Cape Hatteras only twenty-five miles off shore, where the depth of water increases to about two thousand fathoms. This revelation of the orography of the Atlantic bottom off our Southern coast is of no little significance. The average depth of water on this long plateau was found by the *Blake* to be but little over four hundred fathoms, and it seems evident, therefore, that it must serve as a vast submarine wall to divert from the Carolina coasts the major part of the glacial undercurrent setting from the Newfoundland Banks to the southwestward. A part of this arctic current, as it moves far beneath the surface, on reaching Cape Hatteras no doubt finds its way between the shore and the prolonged Bahama Bank, even to the Florida coast, but only a small part. The effect of this subma-